Upland Management: Protecting Water Quality Before The Pond

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ASHLEY COOPER
STORMWATER EDUCATION CONSORTIUM

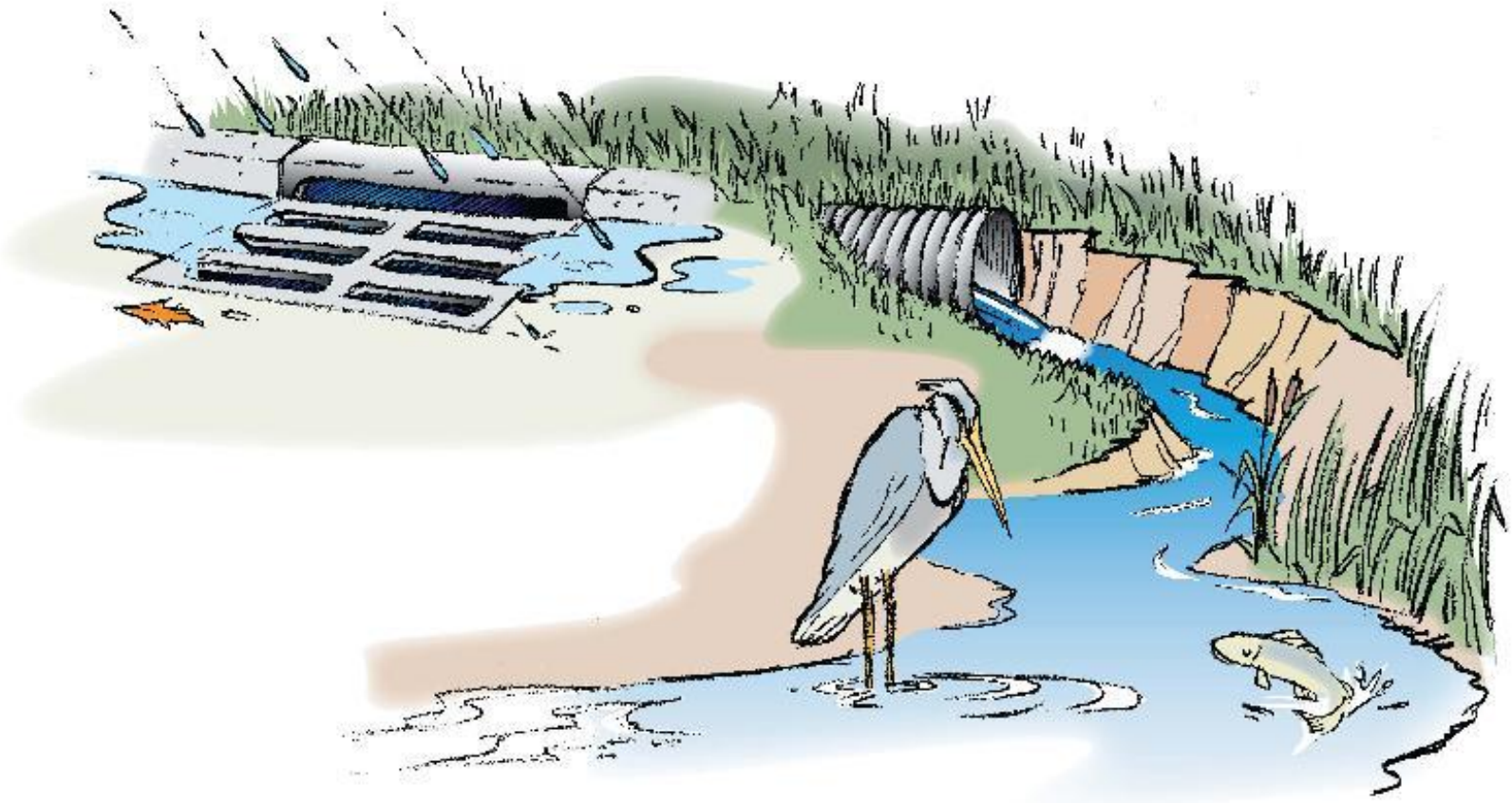
What Every Resident Should Know About Stormwater Ponds

Stormwater Ponds provide critical services:

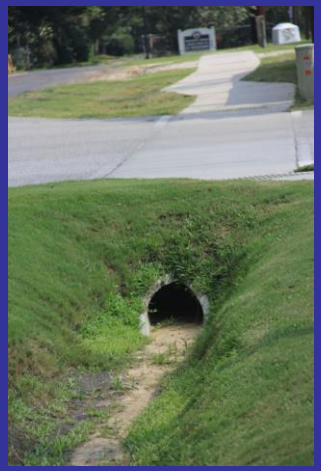
-SW Ponds prevent flooding by suppressing surges of stormwater runoff from houses, driveways, cars, etc

-SW Ponds protect water quality by holding water long enough to allow gravity and other processes to remove sediment and pollutants from the water before it is discharged to nearby waterways or beaches.

Common Problems and Their Causes



Muddy Ponds



Potential Causes:

- Unstable pond banks scoured by wave energy
- Exposed soils in the community and along pond edges
- Biological factors such as fish, turtles, and waterfowl

Potential Solutions:

- Stabilize banks with vegetation
- Establish grass and vegetation in yards to prevent erosion
- If remains muddy, filtration system or additive may be needed

Surface Films and Sheens

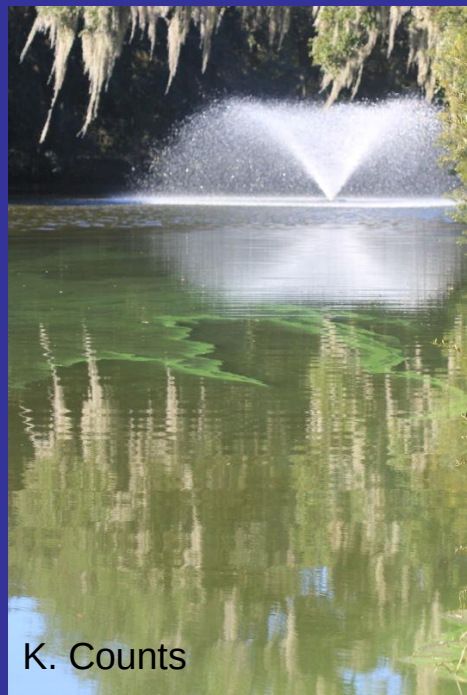
Potential Causes:

- Pollen and atmospheric dust
- Blue-green algae
- Hydrocarbons and oils
- Insoluble compounds in the soil


K. Counts

Potential Solutions

- Biological Sources (pollen or algae) typically biodegrades in a few weeks time
- Identify and eliminate source of oil


K. Counts

Shoreline Erosion

Potential Causes:

- Pond banks with grass mowed to the edge
- Fountains
- Nuisance wildlife

Potential Solutions

- Stabilize shoreline with emergent wetland plants or artificial material
- Move fountains to center of pond or consider replacing fountain with other type of circulation system
- Stop feeding ducks and geese

Foam

Potential Causes:

- Illicit discharges of soap and detergents
- Naturally occuring, typically associated with algal blooms

Potential Solutions

- Identify and reduce source of soap and detergents

Polluted water

Potential Causes:

- Fertilizing lawns
- Pet waste
- Washing cars
- Automotive maintenance
- Pesticides
- Feeding wildlife

Potential Solutions:

Sources of pollution are best minimized by educating the community about the effects of stormwater pollution (EPA)

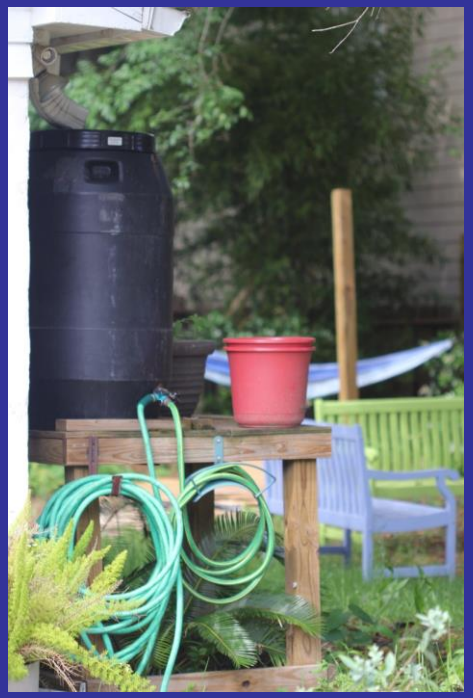
Non-Structural Best Management Practices

Combatting Common Threats to Water Quality

Irrigation Practices

Over-watering can encourage weed growth and plant disease, lead to increased stormwater runoff.

- Irrigate lawns early in the morning for efficient water use and to discourage the spread of disease.
- Never irrigate on impervious surfaces
- Learn to recognize signs of stress (Ex. Crunching)
- Track Rainfall-Install a Rain Gauge!



Be Wise When You Fertilize

- Test soil before applying fertilizer (HGIC 1652)
- Never apply fertilizer on impervious surfaces
- Always follow the label, the “Label is the Law!”
- Look for 0 to low Phosphorus fertilizer
- Always store properly

Scotts drops phosphorus from lawn fertilizer

Marysville company acts to reduce risk of runoff feeding toxic-algae blooms in lakes; competitors likely to follow its lead

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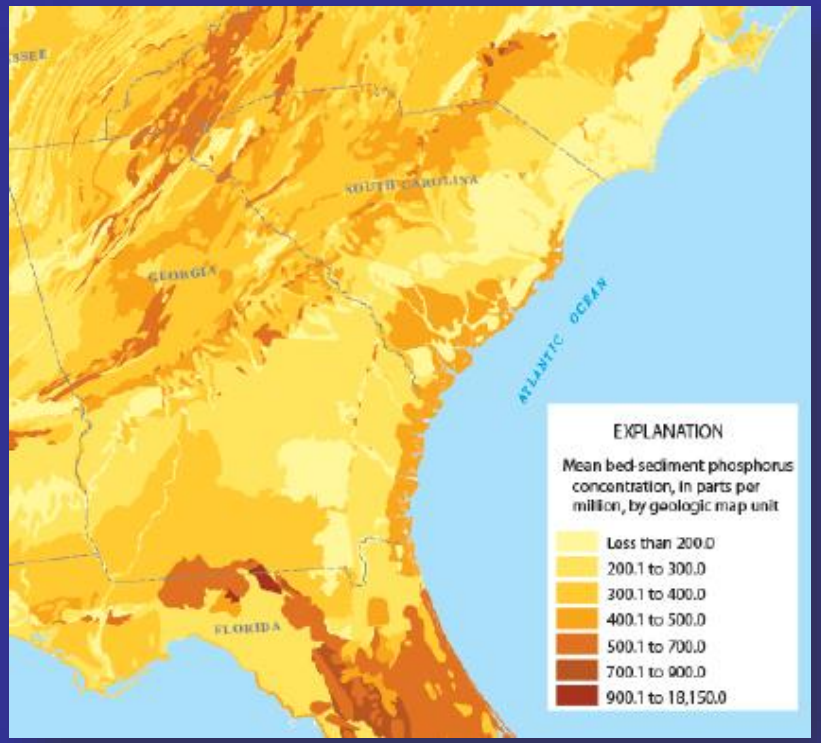
Source: USGS NAQWA Program

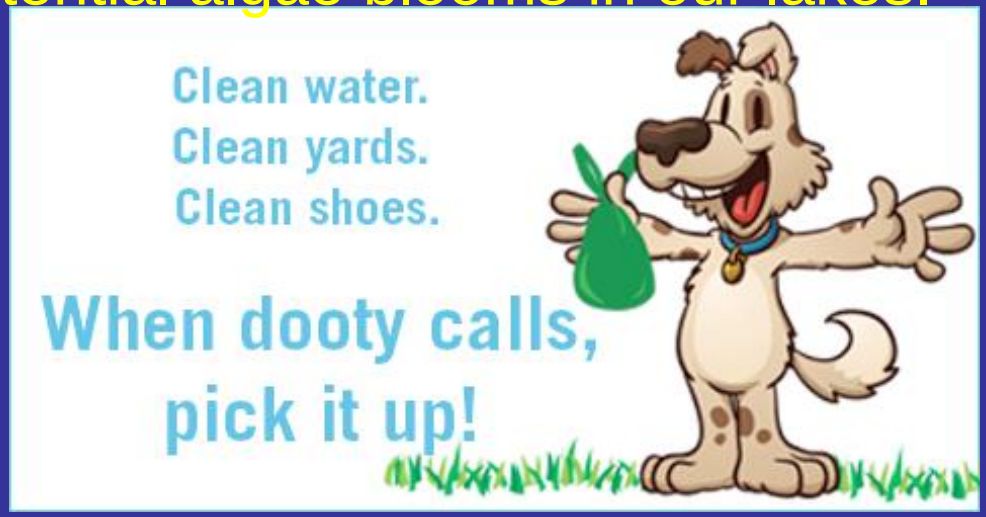


Pet Waste Management

Install a pet waste station in your community space!

What's the Problem?

- Pet waste contains bacteria that can be harmful to human health
  *2.5X's that of humans
  *10,000 lbs in Charleston Area a day
  –SCDHEC
- Nutrients in the waste also add to potential algae blooms in our lakes.



No Spray/No Mow Zones Along Freshwater Shorelines

Lawn should be kept at the maximum recommended height for the specific turf

- allow for a more extensive root system
- help stabilize soil
- larger leaf area, which can work to slow runoff, and capture sediment

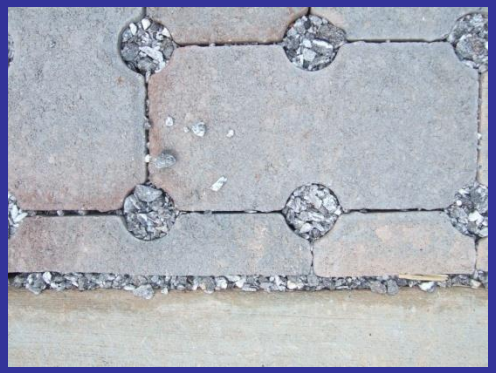
Avoid use of fertilizers and pesticides along shorelines

- use right plant for right place
- hand pull weeds
- plant closely to outcompete weeds

Structural Best Management Practices

- Rain barrels/cisterns
- Rain gardens
- Porous materials
- Vegetative buffers
- Use of Native Plants






Slide by: Dr. Daniel Hitchcock

Pond Retrofits

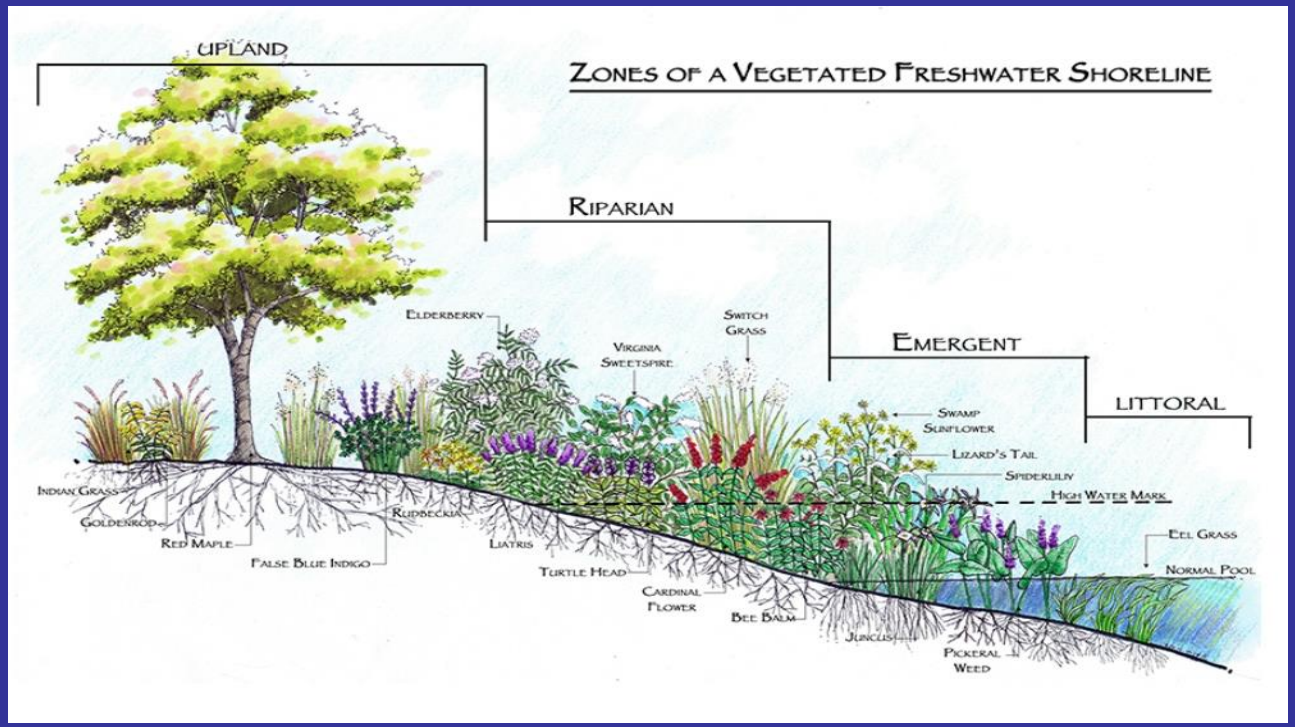
Shorescaping: the practice of establishing a vegetative shoreline to help prevent erosion and protect water quality.

BEFORE

AFTER

Vegetative Buffers/Shorescapes

- Wildlife Management
- Combat Invasive Weeds
- Protect Water Quality
- Stabilize Shorelines
- Can be an attractive feature



Need a manicured look to your shorescape?

- INSTALL EDGING
- KEEP UP WITH MOWING AROUND PERIMETER
- PRUNE BROKEN OR DEAD BRANCHES
- HANG A BIRD FEEDER OR BIRD HOUSE
- TRAIN A FLOWERING VINE ON AN ADJACENT FENCE POST (INTEREST!)

CAN'T COMMIT?

Establish a low-maintenance meadow.

Limit:

- Mowings and grass clippings,
- Excess fertilizer applications, and
- Herbicide use around pond

Porous Materials

Incorporate permeable walkways, driveways and paths.

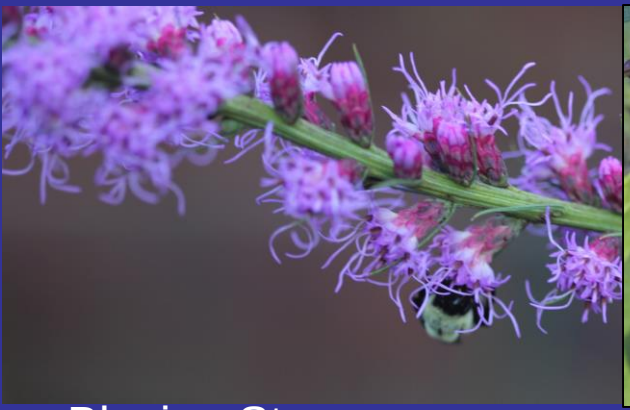
- Porous Asphalt
- Pervious Concrete
- Interlocking Pavers
- Gravel Paths
- Mulched Paths

Benefits & Considerations of Porous Materials

- Volume Reduction
- Flood Control
- Water Quality
- Heat Island Mitigation
- Compliance

Native Plant Landscaping :

- Sense of Place
- Combat Invasive Plant Species
- Support Biodiversity
- Require Little to No Fertilizer/Irrigation
- They are Hardy & Pretty at the same time!



Blazing Star
Liatris spicata

American Beautyberry
Callicarpa americana

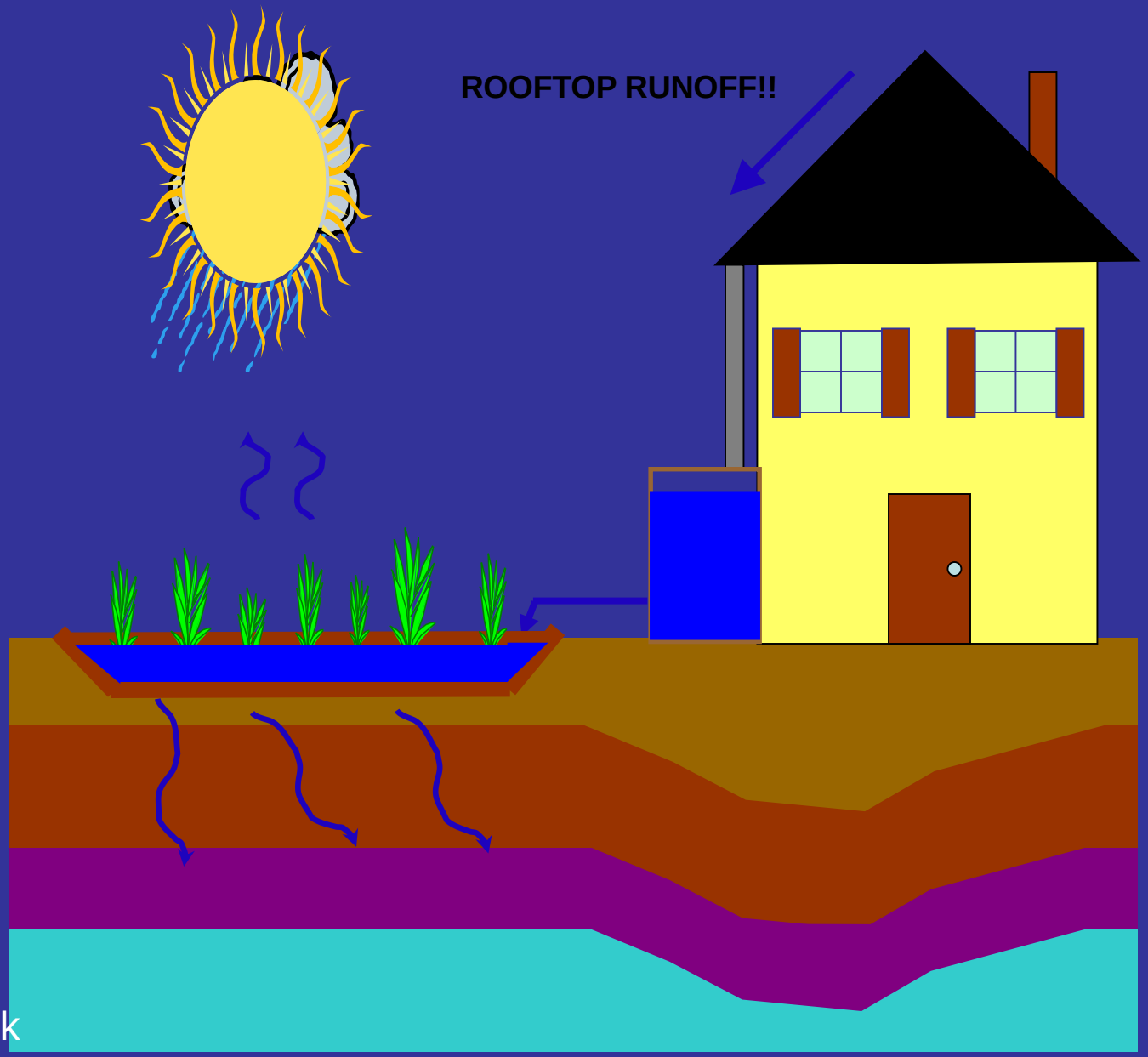
Narrowleaf Sunflower
Helianthus angustifolius

Stokes Aster
Stokesia laevis

Purple Coneflower
Echinacea purpurea

Oakleaf Hydrangea
Hydrangia quercifolia

Rain Gardens & Rainwater Harvesting



Slide by: Dr. Daniel Hitchcock

What is a Rain Garden

A **rain garden** is a planted depression that allows rainwater runoff from impervious urban areas, like roofs, driveways, walkways, parking lots and compacted lawn areas, the opportunity to be absorbed.
-Wikepedia

Why Rain Gardens?

- Allows for **Collection and infiltration** of stormwater runoff (reducing quantity)

- **Manage erosion & moisture control issues** around home

- **Beautify** the landscape

- Plants and microbes do the work of **pollutant removal** (protecting downstream water quality)

- **Attract desirable wildlife** (birds and butterflies)

- **Water-wise:** A smart way to irrigate

Barrier Benefit Analysis Residential Rain Gardens

Barriers	Benefits
Unsightly	Aesthetically pleasing landscape feature
Mosquito breeding ground	Manage stormwater issues
A lot of work upfront	Easily maintained over time
Money	Long lasting landscape feature
Perceived pressure of social norm	Environmentally friendly approach to gardening (“green gardening”)
Lack of knowledge	Existing Resources

Carolina Rain Garden Initiative

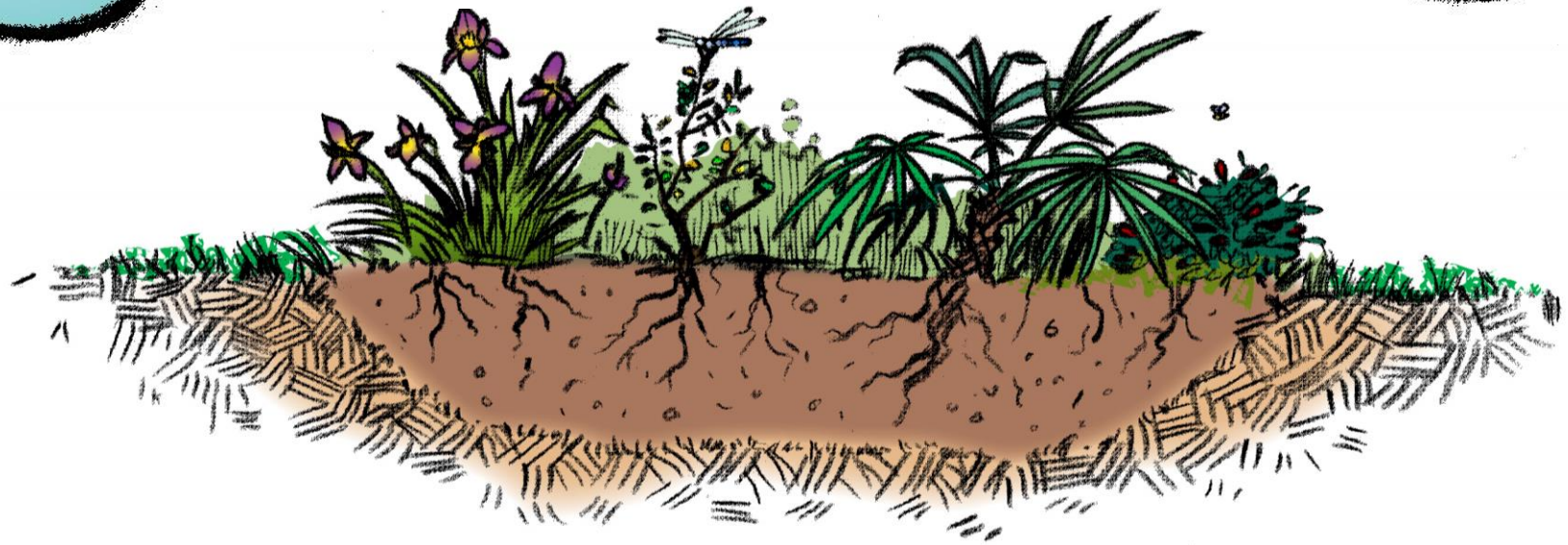
Demo Sites

Professional Recognition

Workshops

Virtual Rain Garden

Rain Garden Tracker



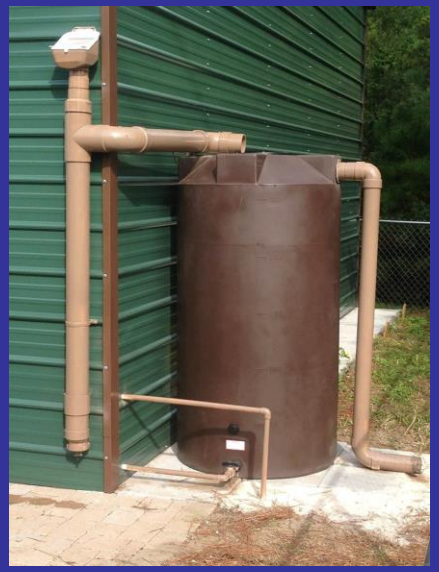
What Is Rainwater Harvesting?

Ancient practice of capturing rain and storing in a reservoir for redistribution/reuse

Collection + Storage + Use

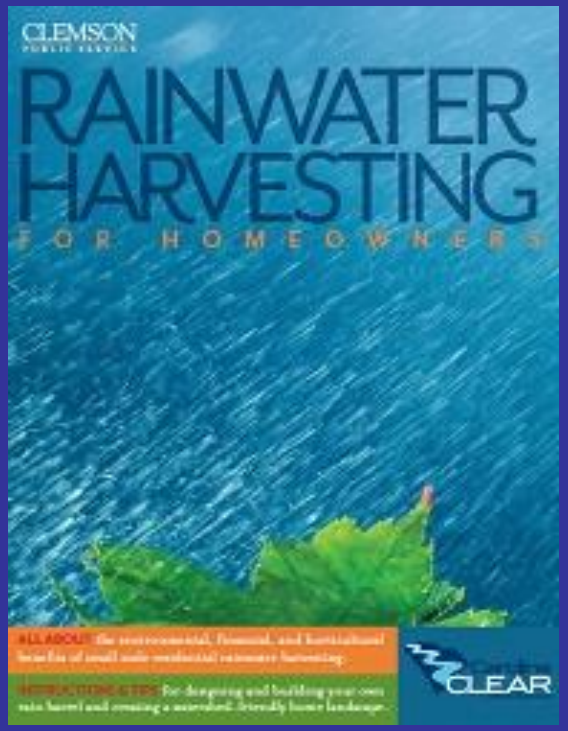
The Cistern, Randolph Hall, College of Charleston, SC

Rainwater Harvesting Comes in All Shapes & Sizes!



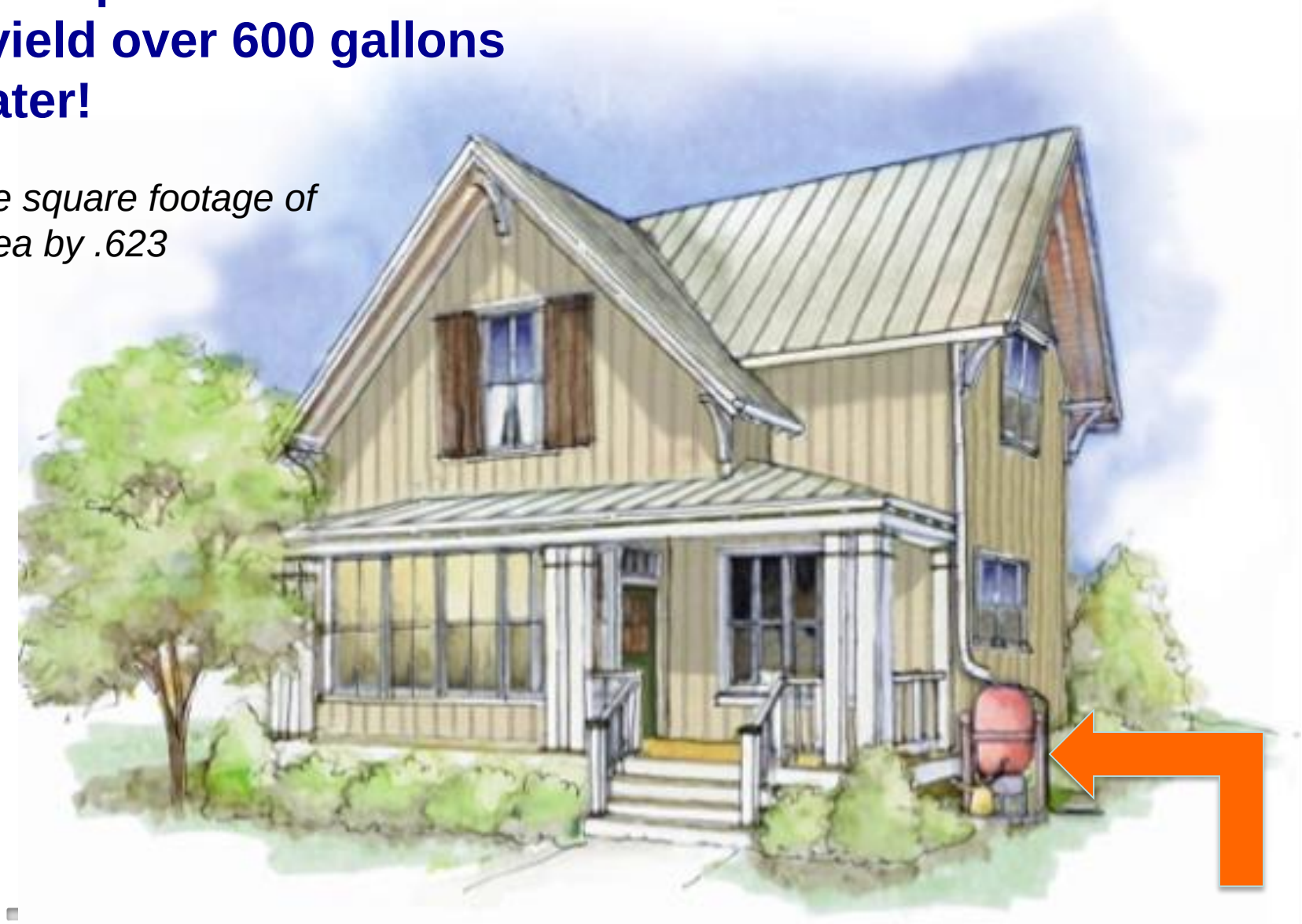
What to Look For When Purchasing a Barrel?

- Outlets that can be turned on and off
- Emergency overflows that allow water to escape when barrel is full (direct away from house)
- Dark colored that prevents sunlight penetration and algae growth
- Recycled barrels, should be food grade never been used to transport chemicals
- Point of water entry secure to exclude small animals/children
- Screening to prevent mosquitoes

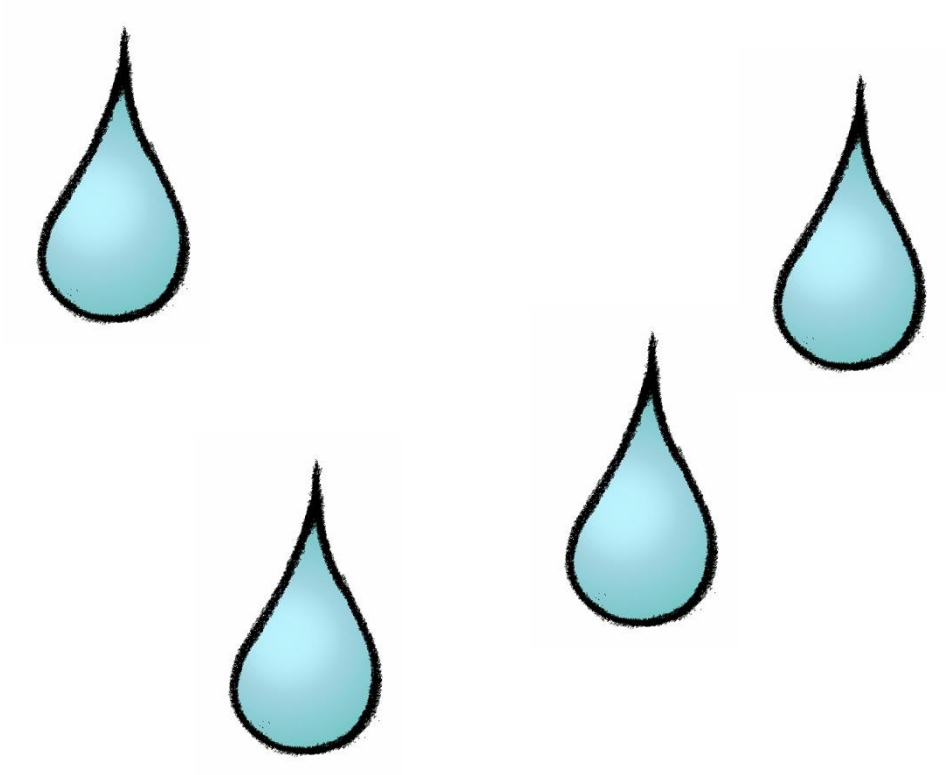


During a one inch rainfall, a 1000 square foot roof can yield over 600 gallons of water!

Multiple square footage of roof area by .623

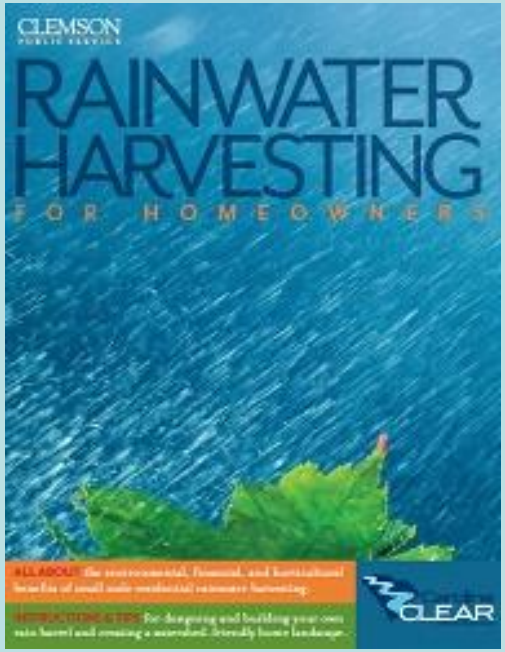


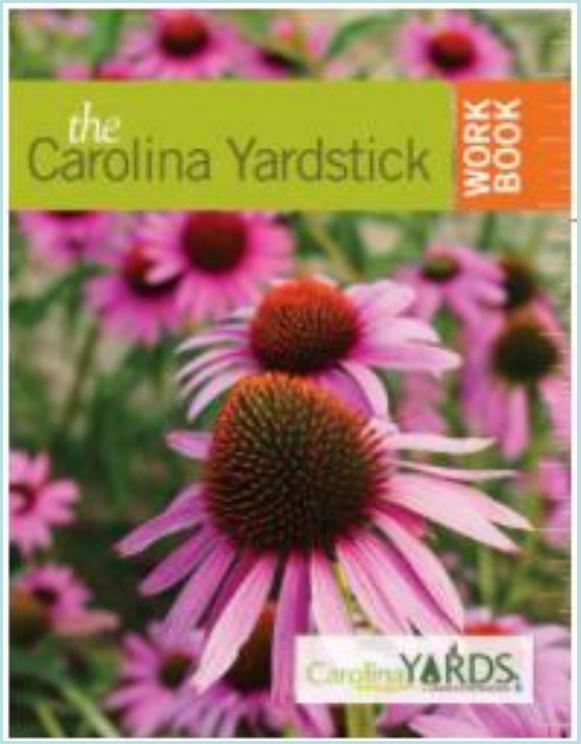
Go outside when it rains and watch how water flows off your roof & across your landscape



And Remember, Use the Water You Capture!

Check out these Clemson Extension Resources!





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SC WaterWays

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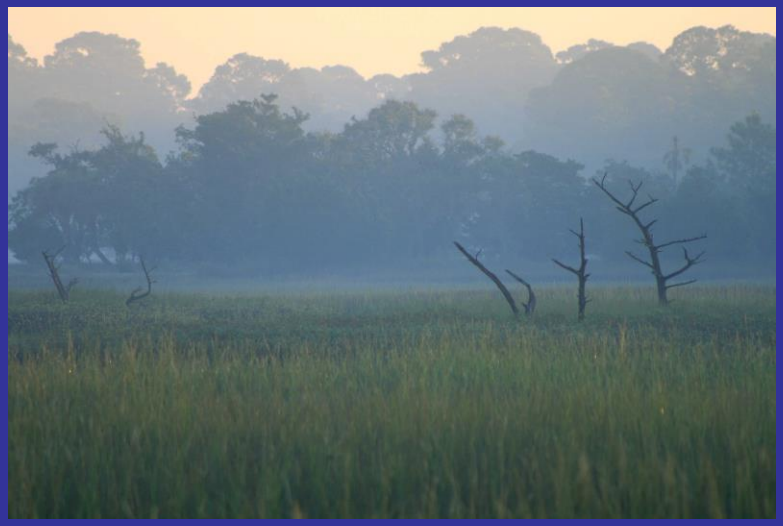
“Reconciliation Ecology”

-Michael Rosenzweig
2003



Redesign of human habitats in order to accommodate other species.

Even if nature is not pristine, does not mean we must give up on nature all together.

Residents play a central role in protecting natural resources for current & future generations